

## Remarks

This Amendment and Response is responsive to a Final Action mailed by the Office on July 3, 2003. Claims 44-50, 57-59 and 64-76 are pending in the application, claims 44 and 57 being independent. Claims 44-50, 57-59 and 64-76 stand rejected.

In the foregoing amendments, claims 44 and 57 have been amended. No new matter has been added. Applicant respectfully requests entry of the foregoing Amendments and reconsideration of the Application in light of the amendments above and the remarks below.

### **I. The Claims are Patentable over Massie**

Claims 44-50, 57-59 and 64-76 stand rejected under 35 U.S.C. §102(e) as being anticipated by Massie *et al.* (U.S. Patent No. 5,625,576).

Independent claims 44 and 57 recite a user object, a closed-loop five member linkage, and at least one sensor. The closed-loop five member linkage includes “a serial-linked chain of a ground member, a first extension member, a first central member, a second central member, and a second extension member, the first and second central members being coupled to the user object via a first object coupling and a second object coupling, respectively,” and is “configured to enable the user object to move in a first rotary degree of freedom, a second rotary degree of freedom and a translational degree of freedom.”

Massie discloses a force reflecting haptic interface, where “a connection element such as a thimble connects to a user’s body member and, through a linkage, to a ground reference.” The linkage disclosed by Massie may include five members (see Figures 10A-C); however, these members do not form a **serial-linked chain**, such as recited in claim 44 or 57. Thus, Massie failed to anticipate the invention as recited in independent claim 44 or 57. For at least those reasons, independent claims 44 and 57 are patentable over Massie. Based on their dependence upon one of independent claims 44 and 57, dependent claims 45-50, 58-59, 64-77 are patentable as well. Applicant respectfully requests that the rejections be withdrawn.

## **II. The Claims are Patentable over Adelstein Combined with Rosen**

Claims 44-47, 57, 59, 64-67, 70, 72-73 and 76 stand rejected under 35 U.S.C. §103(a) as being unpatentable over Adelstein (A Virtual Environment System For the Study of Human Arm Tremor) in view of Rosen (U.S. Patent No. 5,107,080).

As stated above, independent claims 44 and 57 recite a user object, a closed-loop five member linkage, and at least one sensor. The closed-loop five member linkage includes "a serial-linked chain of a serial-linked chain of a ground member, a first extension member, a first central member, a second central member, and a second extension member, the first and second central members being coupled to the user object via a first object coupling and a second object coupling, respectively," and is "configured to enable the user object to move in a first rotary degree of freedom, a second rotary degree of freedom and a translational degree of freedom."

Adelstein discloses a five-link closed chain joystick mechanism. As shown in Figure 4.3 and stated on page 62, in the system of Adelstein, "the handle shaft is simply an extension of one of the links in the chain." In other words, the handle shaft is a monolithic part of one of the central members (associated with  $j_4$ ).

Rosen discloses a damped hand control system, where a handle is coupled to yoke assemblies 34 and 36 that allow the handle to move (or "slide" through two slots 34a and 36b) in the X and Y directions, and additionally to slide through the two slots 34a and 36b in the Z direction (see, e.g., Figure 4).

Neither Adelstein nor Rosen discloses or suggests using **a first object coupling and a second object coupling** to couple the first and second central members of the closed-loop five member linkage to the user object, respectively, as recited in claim 44 or 57. More specifically, Adelstein at best discloses a single coupling to a user object, joint  $j_5$ . Rosen at best discloses a single coupling to a user object, rotation sensor 40. In addition, Rosen and Adelstein are not properly combinable because Adelstein fails to provide a structure to which the rotation sensor 40 can be coupled. Thus, the invention as recited in independent claim 44 or 57 is not disclosed in or suggested by Adelstein combined with Rosen. For at least those reasons, independent claims 44 and 57 are allowable. Based on their dependence upon one of independent claims 44 and 57, dependent claims 45-50, 58-59 and 64-77 are also allowable. Applicant respectfully requests that the rejections be withdrawn.

**III. The Claims are Patentable over Rosen Combined with Adelstein and Scott-Jackson**

Claim 48 stands rejected under 35 U.S.C. §103(a) as being unpatentable over Rosen in view of Adelstein and further in view of Scott-Jackson et al. (U.S. Patent 4,590,339).

For at least the reasons stated in Section II above, independent claim 44 is patentable. At least because claim 48 depends from independent claim 44, claim 48 is patentable as well. Accordingly, Applicant respectfully requests that the Examiner remove the rejection of claim 48.

**IV. The Claims are Patentable over Adelstein Combined with Rosen and Tuason**

Claims 49-50 and 74-75 stand rejected under 35 U.S.C. §103(a) as being unpatentable over Adelstein in view of Rosen and further in view of Tuason (U.S. Patent 5,403,191).

For at least the reasons stated in Section II above, independent claims 44 and 57 are patentable. At least because claims 49-50 and 74-75 depend from one of independent claims 44 and 57, claims 49-50 and 74-75 are also patentable. Accordingly, Applicant respectfully requests that the Examiner remove the rejections of these claims.

**V. The Claims are Patentable over Adelstein Combined with Rosen and Massie**

Claims 58, 68-69 and 71 stand rejected under 35 U.S.C. §103(a) as being unpatentable over Adelstein in view of Rosen and further in view of Massie (U.S. Patent 5,625,576).

For at least the reasons stated in Section II above, independent claims 44 and 57 are patentable. At least because claims 58, 68-69 and 71 depend from one of independent claims 44 and 57, claims 58, 68-69 and 71 are patentable as well. Accordingly, Applicant respectfully requests that the Examiner remove the rejections of these claims.

### Conclusion

All of the claims are in condition for allowance. Applicants believe that a full and complete response has been made to the outstanding Office Action and, as such, the present application is in condition for allowance. If the Examiner believes, for any reason, that personal communication will expedite prosecution of this application, the Examiner is invited to telephone the undersigned at the number provided.

Prompt and favorable consideration of this Amendment is respectfully requested.

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Respectfully submitted,

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